CHAPTER 4

ACCIDENT INVESTIGATION AND ANALYSIS

HOW TO INVESTIGATE, ANALYZE, AND DOCUMENT ACCIDENTS

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THIS SPACE AVAILABLE FOR NOTES:

CHAPTER 4

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4.00 INTRODUCTION

This chapter deals with promoting and maintaining an interest in accident investigation and analysis. Its primary focus is to provide an understanding of investigative techniques that will make an investigation and analysis easier to conduct. The techniques discussed in this chapter can be used to investigate accidents associated with any work activity.

Investigating and documenting occupational injuries and illnesses is a mandatory requirement of the Department's Injury and Illness Prevention Program and Cal/OSHA regulations.

4.01 PURPOSE

The purpose of this chapter is to provide basic information about accident investigation techniques and procedures. Management encourages accident prevention through aggressive investigation and analysis as a defense against hazards in the workplace.

An accident is broadly defined as an undesired event that results in physical harm to a person or damage to property and/or the interruption of a process. It also includes events that result in a non-injury, a near hit, an occupational illness, or exposure to hazardous substances.

4.02 POLICY STATEMENT

Supervisors shall investigate, analyze, and document every vehicle accident, occupational injury and/or illness in a timely manner to identify contributing factors that will prevent further occurrences.

4.03 WHO SHOULD CONDUCT ACCIDENT INVESTIGATIONS?

- **THE FIRST-LINE SUPERVISOR**

Since investigating and documenting occupational injuries and illnesses is a mandatory requirement of the Department's safety program and Cal/OSHA regulations, the first-line supervisor is responsible to conduct an investigation. The first-line supervisor is generally on the scene and probably knows more about the accident and accident scene than anyone else.

- **THE SECOND-LINE SUPERVISOR**

A representative of management should review the findings of the first-line supervisor. The management review also ensures that first-line supervisors are conducting accident investigations.

- **THE SAFETY SPECIALIST**

A representative of the District or Headquarters Office of Safety and Health is available to advise and/or assist in the investigative effort. The safety staff have specialized training and experience that enables them to search for all the facts, apparent and hidden. Safety Specialists are impartial and their primary interest is to gather information that can be used to prevent a similar accident. The Safety Specialist can also help identify violations of policy, law, and assist in suggestion of corrective measures.

4.04 ANALYZING THE ACCIDENT SCENE

An investigation should be made as soon after the accident as possible. Any delay may result in evidence being destroyed or removed.

A documented review of the accident scene will produce information that can help:

- identify and locate the materials, machines, and tools involved in the accident.
- reveal deficiencies in operating processes and procedures.
- disclose unsafe work practices caused by a lack of training.

4.05 FACT FINDING

The purpose of an accident investigation is to find facts not fault. The facts will then serve as a guide to the conditions that caused the accident. The facts should identify the "why" or root cause of the accident as well as the "who, what, when, and where."

The goal of fact finding is to have the investigator expand their thinking and not focus solely on the type of accident or the injury. A broader view of the facts surrounding the accident will help point to contributing factors that lead to the root cause. This expanded view will also help the investigator identify a variety of preventive measures used to correct the situation or condition.

The following information lists a variety of subject areas that should be included in an accident investigation. The investigator must be creative and inquisitive. Review the following items:

- WORK CHARACTERISTICS -
  What is the type of work activity and the size of the operation? How many employees are involved? Too many, too few?

- ENVIRONMENT -
  Was the weather a contributing factor: clear, rain, snow?

- TIME FACTORS -
  The time of day, and how it relates to the shift, whether first hour or last: swing shift, straight eight, or rotating. The phase of the employees work: performing work, rest period, lunch period, overtime, entering or leaving the work site, building, or office.

- EMPLOYEE CHARACTERISTICS -
  What is the victim's work experience? How often is the work activity repeated? How often has the employee engaged in such work? How much training and when was the last training?

- A NARRATIVE DESCRIPTION -
  Explain what the person was doing. What objects were involved? Which actions and movements led to the accident?

- EQUIPMENT CHARACTERISTICS -
  Describe the type, brand, model, size, and any distinguishing features, its condition, and the specific part of the equipment involved. Include the identification number, and any known modifications that may have been made to the equipment.

- CHARACTERISTICS OF THE TASK -
  The general task being performed (repairing a wing plow) and the specific activity (using a power impact wrench). The posture and location of employee (squatting under the rear of the truck). Working alone or with others.

- PREVENTIVE MEASURES -
  What personal protective equipment was being worn? What kind of training did the employee have for the task he or she was performing? Did standards for the procedure exist? Were they written? Were they followed? Where was the supervisor at the time of the accident?

- ACCIDENT SEVERITY-
  The nature of the injury or injuries and parts of the body affected.

After reviewing these statements, the final analysis should suggest specific corrective action or actions that will prevent recurrences of the sequence of events that led to the accident.

4.06 CATEGORIES FOR CORRECTIVE ACTION

The investigator must first form a basic understanding of the events that took place. Then at each step of the sequence of events he/she should see if a change in one of those areas would have prevented the sequence from continuing.

The following list of categories should be evaluated for practicality, cost, feasibility, reliability, acceptance, and other factors deemed important before deciding which to implement. The selection process should not stop with only a favorite idea or favorite action; each action chosen for consideration and implementation should be well thought out. Things to look at are:

A. MACHINES
   1. Hazardous conditions, construction, or design.
   2. Equipment, tools, and objects.

B. PHYSICAL WORK ENVIRONMENT
   1. Location of equipment, tools, and objects in the workplace.
   2. Location of employees in the work space.

C. EMPLOYEES
   1. Action, task, or activity.
   2. Work procedures.
   3. Personal protective equipment.

D. MANAGEMENT
   1. Supervision.
   2. Program evaluation.
   3. Training.

4.07 APPLYING THE ANALYSIS

An analysis will always reveal information which can be used effectively in reducing accidents. Merely obtaining the information will not prevent recurrence of the accident. The conditions which contribute to the accident must be corrected.

It must be stressed that these guidelines do not provide a ready answer to accident prevention, but rather a guide to aid in accident investigations, analysis, and corrective action. Corrective action must focus on such things as eliminating unsafe conditions and correcting unsafe acts. See definitions on next page.

UNSAFE CONDITION:

An unsafe condition is a mechanical and/or physical hazard that is recognized, but not corrected and/or ignored, or an unrecognized mechanical and/or physical hazard.

UNSAFE ACT:

An unsafe act is when an employee(s) deviates from a written and/or verbal instruction, policy, procedure, work practice.

4.08 HUMAN FACTORS AND THE ACCIDENT ANALYSIS

The following human factors are considered the most frequent cause of accidents:

- Physical inability
- Boredom
- Distraction
- Impatience
- Resentment of authority
- Overconfidence
- Disregard of danger
- Anger
- Horseplay
- Inattention to instruction
- Absentmindedness
- Undue haste
- Indifference
- Fatigue
- Stress

The following paragraph illustrates some of the contributing human factors listed above:

A worker who lacks skill at a job of loading heavy parts may become fatigued from his/her clumsy efforts to do what a more skilled worker would do easily. This same unskilled worker would fall behind and then try to hurry to catch up. Encountering a minor difficulty, the same employee may lose patience and throw his/her weight needlessly into the task which could result in a fall or other injury. It is easy to see that one cause of the unsafe act was anger or impatience. Other causes were undue haste, fatigue, and a lack of skill. However, the root cause was lack of proper training.

4.09 PREPARING THE INVESTIGATIVE REPORT

Accurate records of accidents or near-misses are essential to an efficient and successful accident investigation and analysis program. Well-documented accident investigations will contain information that can be used to transform haphazard, costly, and ineffective work into a planned safety program. The investigation should point to the cause. It should indicate such things as:

1. At what point did the system break down?
2. Were rules and regulations violated?
3. Did poor layout of the job, process, or operation contribute to the accident?
4. What human or environmental factors contributed to the accident?

The investigation should be handled by the supervisor and reviewed by others as may be deemed appropriate. The investigator should know the nature of the work, how it should be done, and under which conditions it was done. The investigator's questions and attitude should demonstrate that the purpose is to gather the facts. The investigator should not be interested in fault or trying to fix blame.

Start with reviewing and assessing the accident scene. Reconstruct the events that led up to the accident.

If necessary, consider taking pictures, measure, and draw a diagram. List all the machines, equipment, and materials that were being used. Get a list of witnesses. Where were they and what did they see or hear? Interview the employee directly involved. If the injury is minor, proceed; if seriously injured, postpone until medical needs are taken care of.

Consider a re-enactment of the events that led to the accident. Try a walk-through and a talk-through re-enactment.

NEVER ASK AN EMPLOYEE(S) TO REPEAT A JOB WHERE AN OBVIOUS VIOLATION OF DIRECTIVES OR AN UNSAFE WORK PRACTICE IS EVIDENT.

The re-enactment will help explain the relationship between the work crew or person, the machine, and the environment.

4.10 COMPLETING THE "ACCIDENT INVESTIGATION FORM"

This chapter provides two (2) accident investigative forms. The first form is a short-version, 2-page document. The second form is six (6) pages and provides for more in-depth analysis.

When filling out either form, remember the information must be reliable, accurate, and in sufficient detail to make an informed decision. The sample investigative forms shown at the end of the chapter provide space to answer each question or statement that may relate to an accident.

The form(s) may be removed from the manual for easy reproduction.

Do not forget to replace the original back in the manual.

The completed investigative form should be routed to the individuals or positions suggested on the form. Also send the District / Headquarters Office of Safety and Health a copy of all accident investigations.

ACCIDENT INVESTIGATION REPORT

Date of Accident: _____ Time of Day: _____ am _____ pm

Name of Injured Employee: _____

Name of Supervisor / Investigator: _____

What was the apparent nature of the employee's injuries?

_____

_____

DESCRIPTION OF ACCIDENT: What was the employee doing?

_____

_____

_____

LOCATION: Where Did the Accident Happen?

_____

_____

WITNESSES: List the names of other employees who may be witnesses:

_____ _____

_____ _____

_____ _____

UNSAFE CONDITIONS: What was unsafe about the operation, the equipment, tools, or the location? Why did the unsafe condition exist?

_____

_____

_____

_____

UNSAFE ACTS: What was done or not done, did anyone do or fail to do that led to the accident?

RECOMMENDATIONS: What action has / should be taken to prevent a similar accident?

1.

2.

3.

REMARKS OR COMMENTS:

PREPARED BY: _____ DATE: _____

APPROVED BY: _____ DATE: _____

COPY SENT TO:

District / Headquarters Safety Office DATE: _____

_____ DATE: _____

4.11 AN ALTERNATE ACCIDENT INVESTIGATION REPORT

"REPORT OF AN OCCUPATIONAL INJURY OR ILLNESS"

The following section describes the alternate accident investigative report. Individual investigators may select either form for their investigative efforts.

INVESTIGATIVE FACTORS:

Because of the infinite number of situations and contributing factors, it is impossible to list all the questions that may apply to a specific accident or event. The following list of items are generally applicable, and should be considered in addition to the statements shown on the accident investigation form.

- What were others doing at the time of the accident?
- Was the person following clearly defined procedures?
- Was the process or task new to the group?
- Did the person/crew receive hazard recognition training?
- Was the person doing authorized work?
- Was the person qualified to do the work?
- Was the correct equipment being used?
- Where was the supervisor?
- Was some type of corrective action suggested in the past, but not taken?

When other questions come to mind, they should be recorded and answered. Summarize the information and record all the facts on the accident report.

REVIEWS AND APPROVALS:

The following is a suggested list of individuals who should be considered for the review and approval process:

1. The Supervisor
2. The Branch Chief, Region Manager, Area Superintendent
3. The Safety Coordinator (Functional area)
4. The District Employee Safety and Health Officer
5. The Headquarters Employee Safety and Health Officer

6. Other: _____

ACCIDENT INVESTIGATION AND ANALYSIS

THIS SPACE AVAILABLE FOR NOTES:

REPORT OF AN OCCUPATIONAL INJURY OR ILLNESS

Date of Accident or Event: _____

Date of Investigation: _____

Identification Number: _____

Location: _____

Type of Work Activity: _____

Name of Supervisor: _____

****

ACCIDENT CATEGORY: ___ INJURY ___ NON-INJURY ___ NEAR-MISS ___ ILLNESS

___ EXPOSURE TO HAZARDOUS SUBSTANCE ___ PROPERTY DAMAGE ___ OTHER

Name of employee injured, ill or exposed: _____

Classification: _____

EMPLOYEE WORK EXPERIENCE:

___ Full-Time ___ Part-Time ___ Seasonal ___ Other:_____

How long in current assignment? _____

How long with Department? _____

WHAT IS THE APPARENT NATURE OF THE EMPLOYEE'S INJURY / ILLNESS?

_____

_____

_____

THE ACCIDENT SCENE: Describe the accident scene. Where did the accident happen ? (Example: in room 222, on Highway 20, at PM 7.35, near the Thomas C. Hague Commemorative Bridge, the #2 toll booth at the Bay Bridge)

_____

_____

THE ACCIDENT OR EVENT: Describe what happened. (Example: the maintenance worker removed the cap from the gasoline tank. The gas spilled onto the ground causing the worker to slip and fall. The worker twisted his ankle and broke his arm when he fell.)

_____

_____

_____

IDENTIFY WHAT WAS BEING USED: What objects / tools / substances were involved? (Example: The ladder was not supported. The table saw was in the "on" position. Possible lack of oxygen in the confined space. Soap and water. Cleaning solvent not ventilated.)

_____

_____

_____

DESCRIBE THE WORK ENVIRONMENT?
(Weather / temperature / light / noise / machinery / aisles / features existed at the time of the accident)

_____

_____

_____

WHAT VEHICLE / EQUIPMENT WAS BEING USED?
(Type / brand name / size / features / condition / how old / parts involved. Include C- No. and Item -No.)

_____

_____

_____

WHAT WAS THE SPECIFIC TASK / WORK ACTIVITY?
(Repairing computer / repairing a wing plow / walking up the stairs / flagging traffic / sitting at drafting table / walking on airport runway)

_____

_____

_____

OTHER SPECIFIC ACTIVITY: (posture, movement / shoveling snow / using power impact wrench / squatting under conveyor belt / pushing mail cart / lifting copy machine cover)

_____

_____

_____

THE WORK CREW: (how many in work crew? working alone or with others?)

_____

_____

_____

TIME FACTORS AND THE TIME OF DAY: HOW IT RELATES TO THE SHIFT: (first half of shift / overtime / rotating / straight eight / rest period / lunch break / entering the work area / leaving the work area)

_____

_____

_____

PROTECTIVE EQUIPMENT / PREVENTIVE MEASURES: (personal protective equipment being used; hard hat, glasses, gloves,clothing / did apparel affect the accident?, were all safety guards in place?)

_____

_____

_____

WORK/SAFETY STANDARDS: (Did standards exists for the job? Were they written/verbal/followed/understood? Was a Code of Safe Operating Procedures discussed?)

SCHEDULING OF WORK: (Did the work/task have to be scheduled at the time of the accident? Could the work/task have been scheduled at a different time or date?)

SUPERVISION: (What was the nature of supervision? Supervisor present/not present: leadworker present/not present)

TRAINING/INSTRUCTION: (Had employee been specifically trained in the activity?)

OTHER COMMENTS: (Summary) Continued on next page.

OTHER COMMENTS: (continued)

_____

_____

_____

_____

_____

_____

_____

_____

_____

INVESTIGATED BY: _____Date:_____

REVIEWED BY: _____Date:_____

RECOMMENDATIONS:
The following corrective actions are recommended:

1. _____

_____

2. _____

_____

3. _____

_____

RECOMMENDATIONS APPROVED:

By:_____ Date: _____

Comments: _____

_____

COPY SENT TO: _____ Date: _____

ACCIDENT INVESTIGATION REPORT:

USE THIS SPACE FOR NOTES, SKETCHES, OR DRAWINGS.

ADDITIONAL SHEETS ATTACHED: YES ___ NO ___